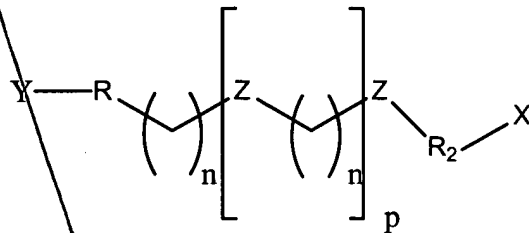


We claim:

1. A nanocrystal linker arm of the following formula:



$n \text{ \& } p = 0-10$
 $Z = O, CH_2, \text{ or } NH$

(I)

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 when $Z = CH_2$?
 $Z = ?$*

wherein Y represents the attachment point to the nanocrystal and
 X represents the attachment point of an organic compound;

R is a bond or is selected from the group consisting of:

SH,

$O(CH_2(n)O)_nSH$,

$NH(CH_2(n)O)_nSH$,

$NH(CH_2(n)NH)SH$,

$S(CH_2(n)O)_nSH$, and

$S(CH_2(n)S)SH$;

n is 1-10; S is the attachment point for the nanocrystal;

R_2 is a bond or selected from the group consisting of

carbonyl,

NH,

SH,

CONH,

COO,

S,

C₁₋₁₀ alkyl,

carbamate, and

thiocarbamate; and wherein

when n and p are 1 or more, the resulting carbon or carbon chain may be substituted.

2. The nanocrystal linker arm of claim 1, where Z is O and n and p are 1-5.

3. The linker arm of claim 1, wherein the attachment point for an organic compound is for an biologically active compound.

4. The linker arm of claim 1, wherein the attachment point is for organic compounds selected from the group consisting of: serotonin or serotonin derivatives, cocaine analogues, phenyl tropane analogues,

phenylisopropylamine derivatives, dopamine derivatives, melatonin derivatives, chlormethiazole derivatives, derivatives of RTI-4229-75, and derivatives of GBR 12935.

5 5. The linker arm of claim 1, wherein Y is an attachment point for nanocrystals with cross sections less than about 200 angstroms.

6. The linker arm of claim 1, wherein Y is an attachment point for nanocrystals selected from the group consisting of CdSe, CdS, PbSe, PbS, and CdTe nanocrystals.

7. The linker arm of claim 1, wherein the linker arm is selected from the group consisting of:

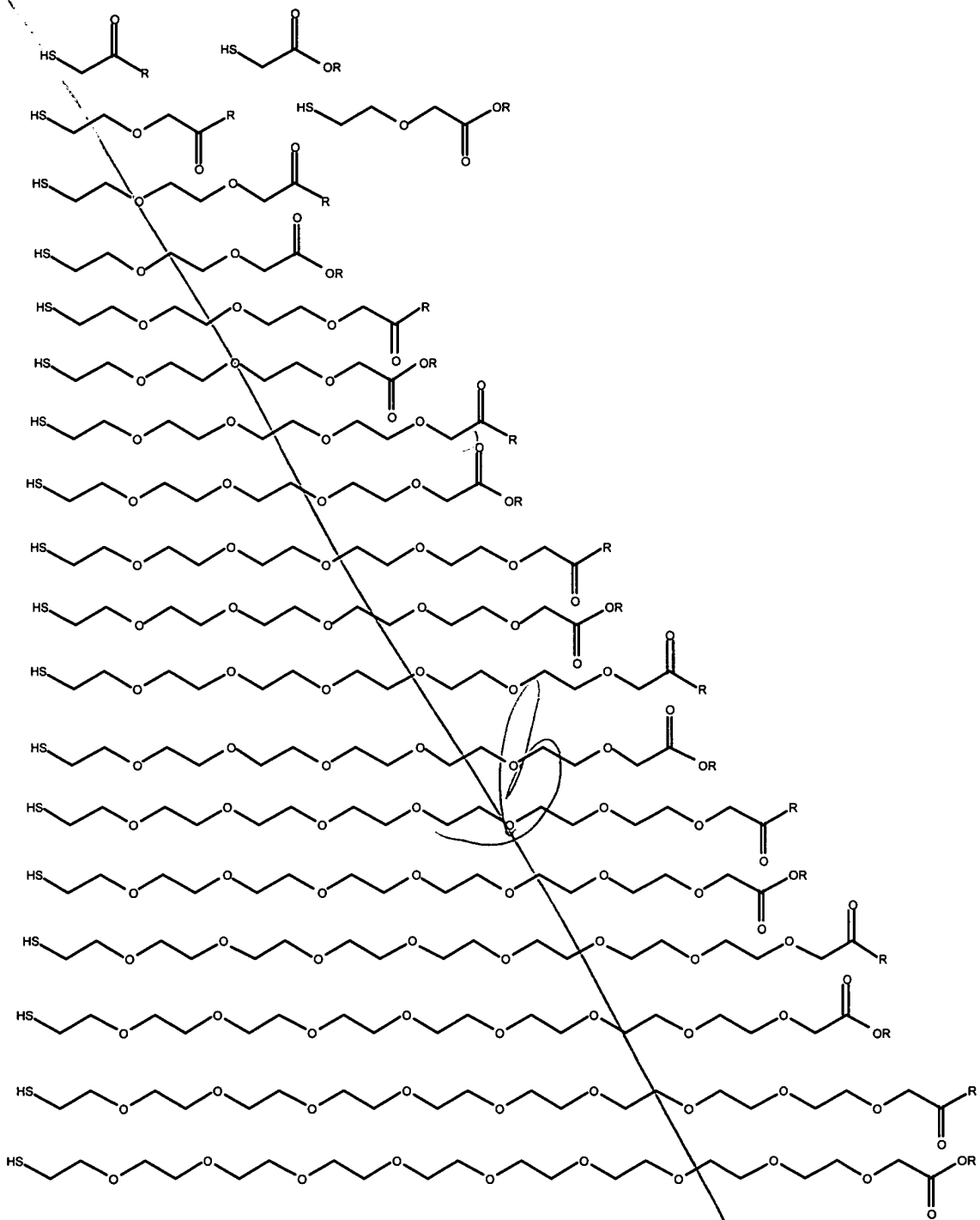
T 0 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0

Diagram illustrating the synthesis of thiol-terminated poly(ethylene glycol) (PEG) chains. The structures are arranged in two columns, separated by a vertical line, showing the progression of the polymer chain length from 1 to 16 units.

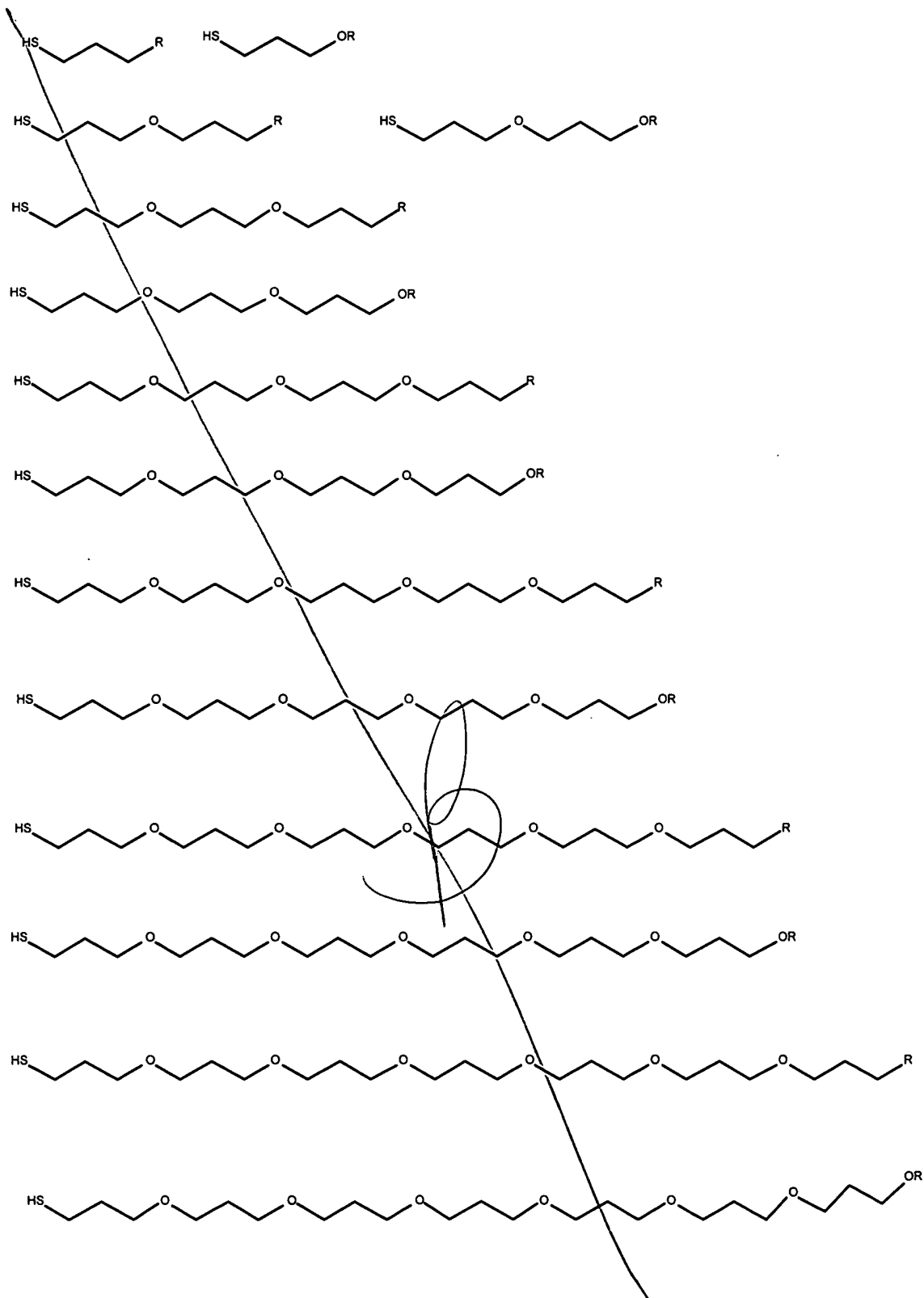
The structures are numbered 1 through 16, representing the number of ethylene glycol units in the chain. The chains are terminated with a thiol group (HS-) on the left and an R group (OR) on the right.

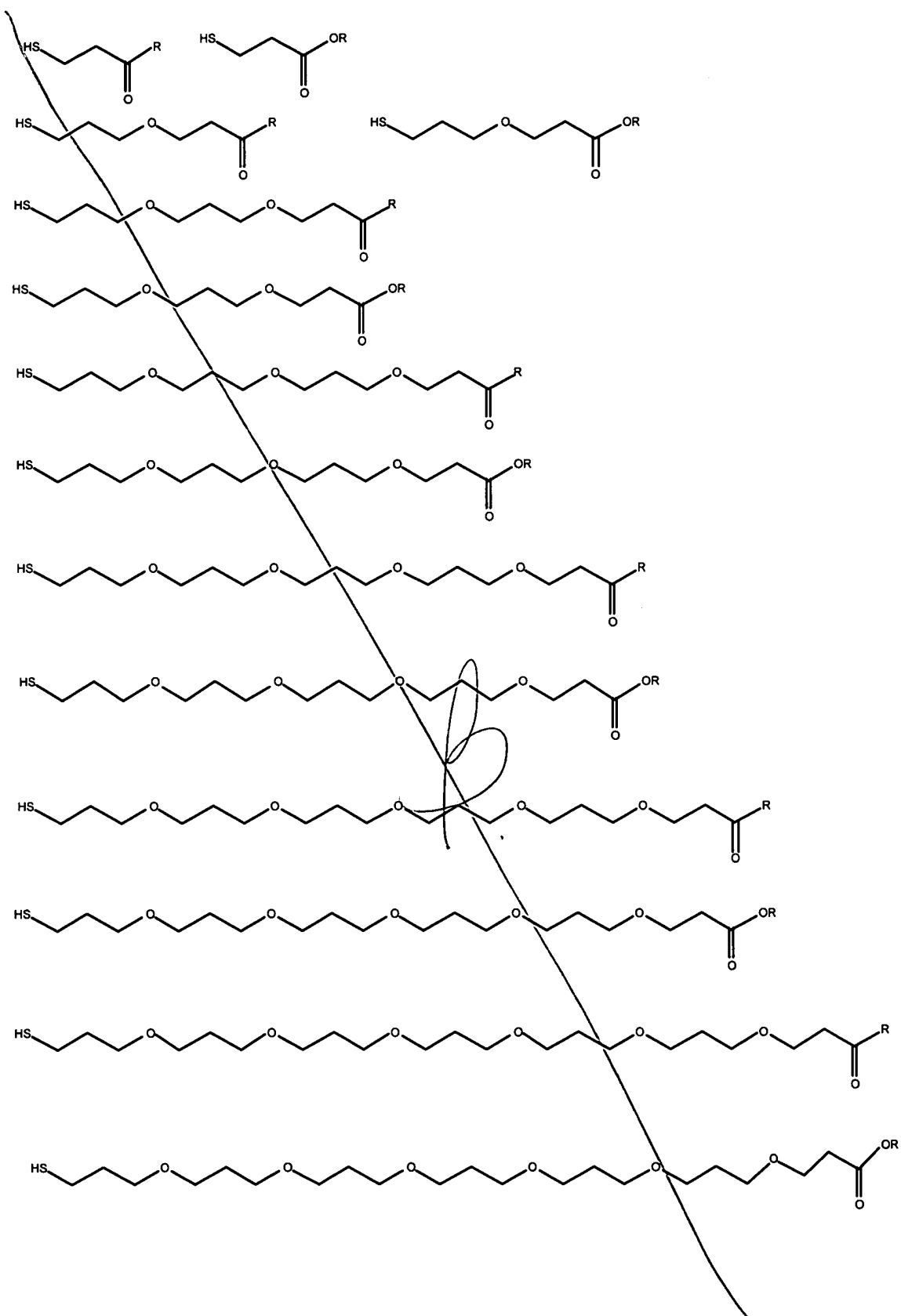
The structures are arranged in two columns, separated by a vertical line. The chains are numbered 1 through 16, representing the number of ethylene glycol units in the chain.

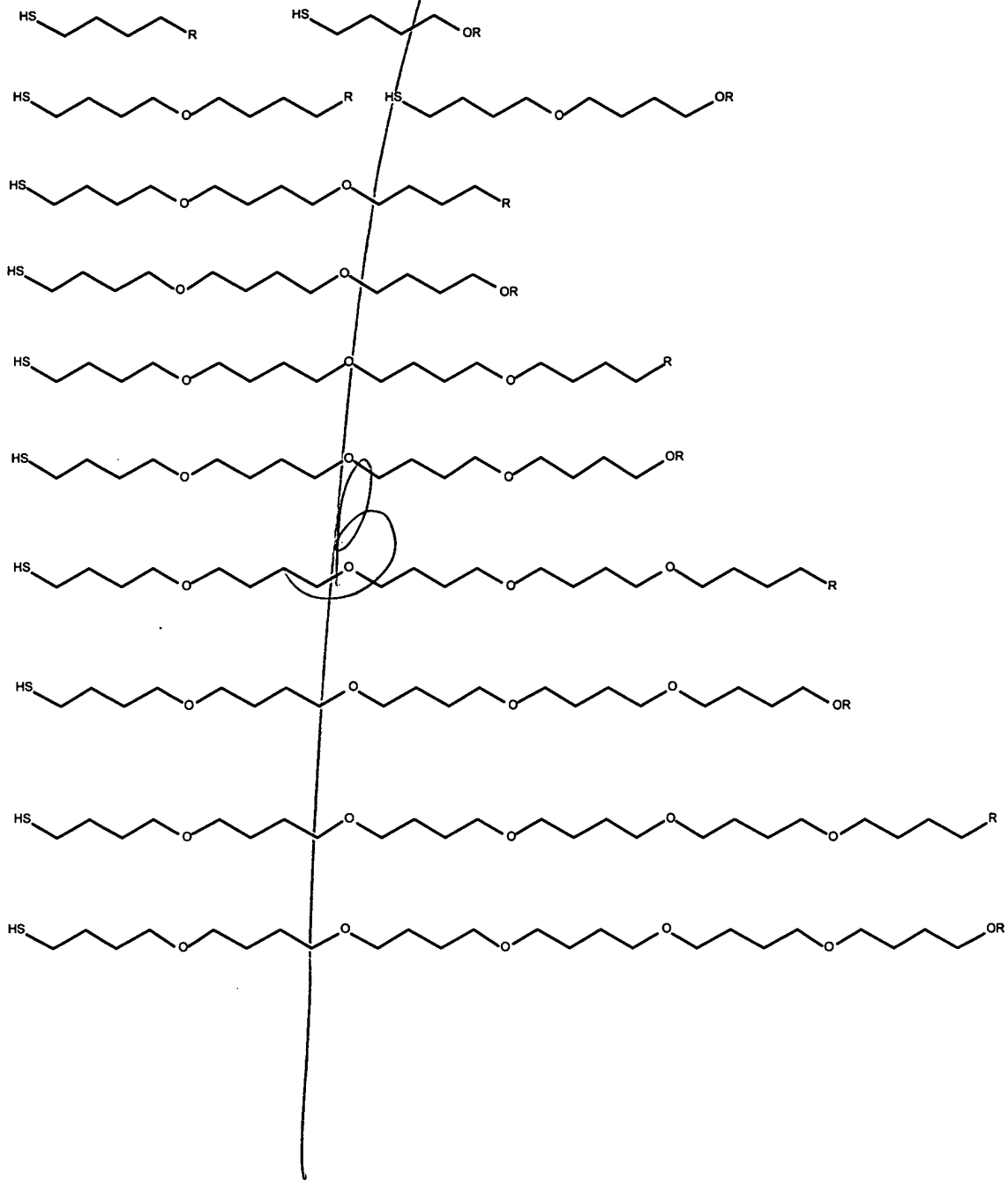
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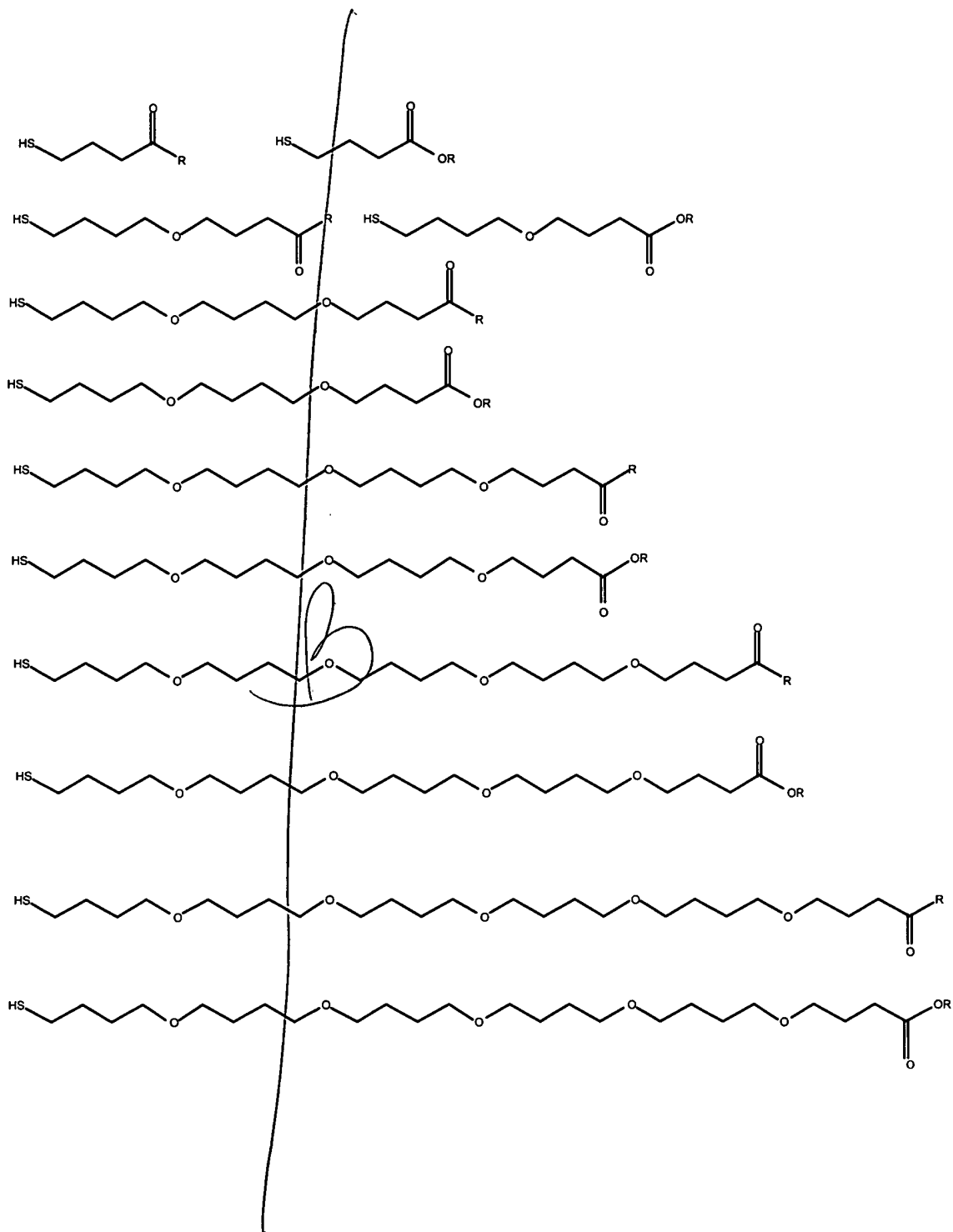






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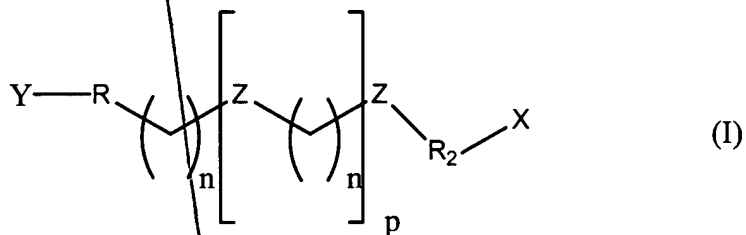


wherein R represents the point of attachment of an organic

5 ~~compound.~~

8. A nanocrystal compound of the following formula:





$n \& p = 0-10$
 $Z = \text{O}, \text{CH}_2, \text{or NH}$

wherein Y represents the attachment point to the nanocrystal and
 X represents the attachment point of an organic compound;

R is a bond or is selected from the group consisting of:

SH,

$\text{O}(\text{CH}_2(n)\text{O})_n\text{SH},$

$\text{NH}(\text{CH}_2(n)\text{O})_n\text{SH},$

$\text{NH}(\text{CH}_2(n)\text{NH})\text{SH},$

$\text{S}(\text{CH}_2(n)\text{O})_n\text{SH},$ and

$\text{S}(\text{CH}_2(n)\text{S})\text{SH};$ n is 1-10, with S being attached to the

nanocrystal;

Sub B2
R₂ is a bond or selected from the group consisting of

carbonyl,

NH, SH,

CONH,

5 COO,

S,

C₁₋₁₀ alkyl,

carbamate, and thiocarbamate; and wherein

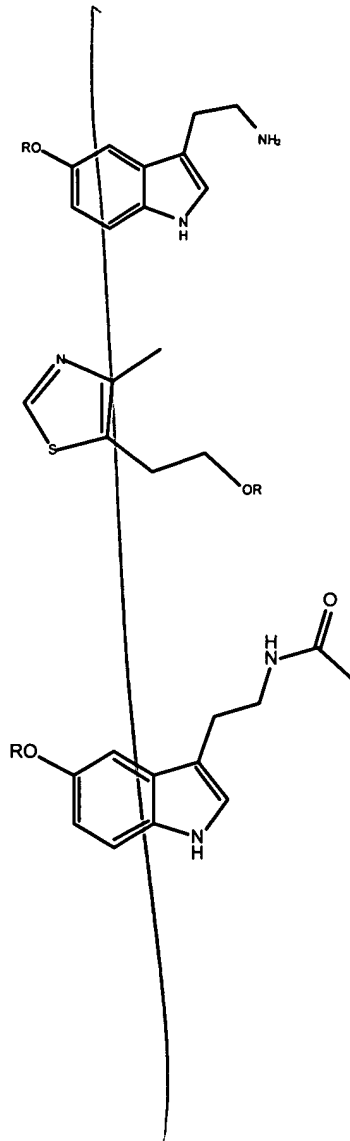
when n and p are 1 or more, the resulting carbon or carbon chain
10 may be substituted.

9. The nanocrystal compound of claim 8, wherein the organic
compound is selected from the group consisting of: serotonin or
serotonin derivatives, cocaine analogues, phenyl tropane analogues,
15 phenylisopropylamine derivatives, dopamine derivatives, melatonin
derivatives, chlormethiazole derivatives, derivatives of RTI-4229-75, and
derivatives of GBR 12935.

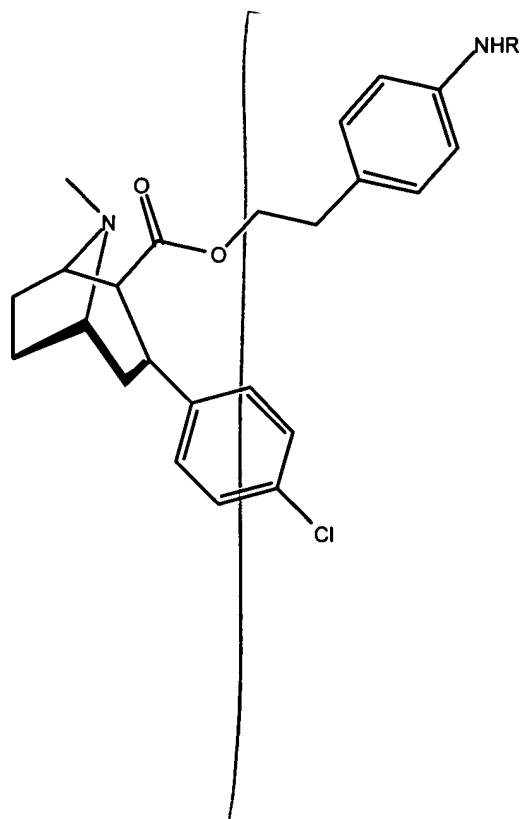
10. The nanocrystal compound of claim 8, wherein the organic
20 compound is selected from the group consisting of:

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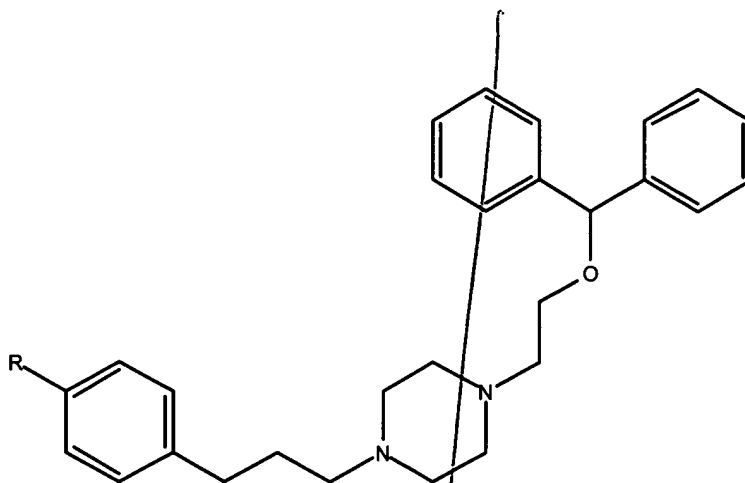
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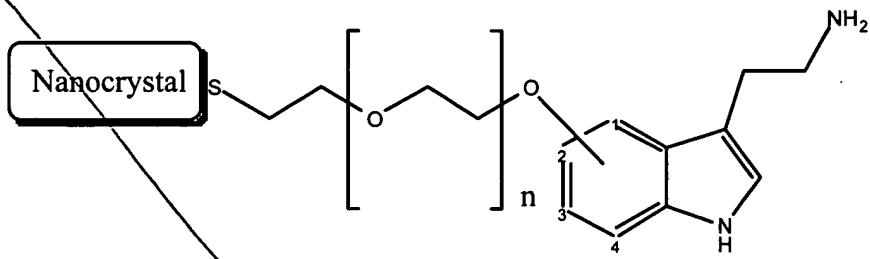
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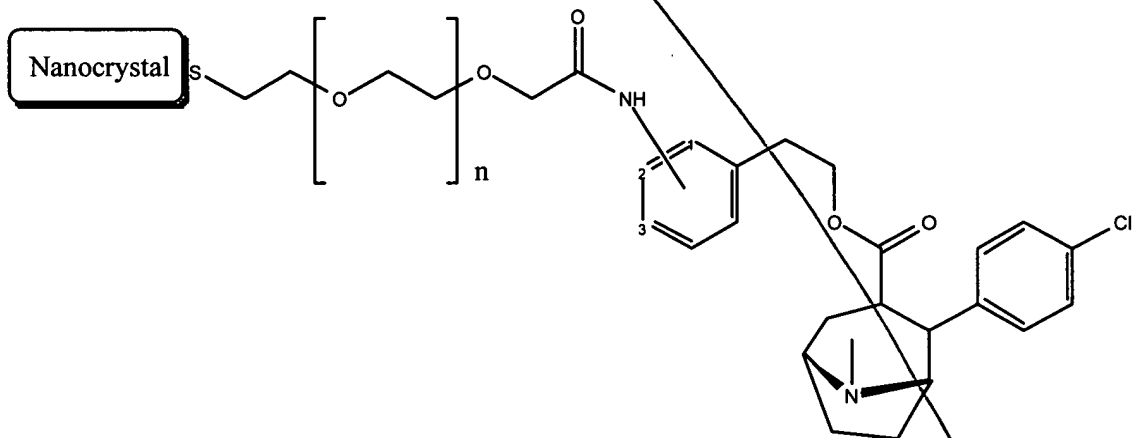
wherein R represents the attachment point to the linker arm.

11. The nanocrystal compound of claim 8, selected from the group consisting of:

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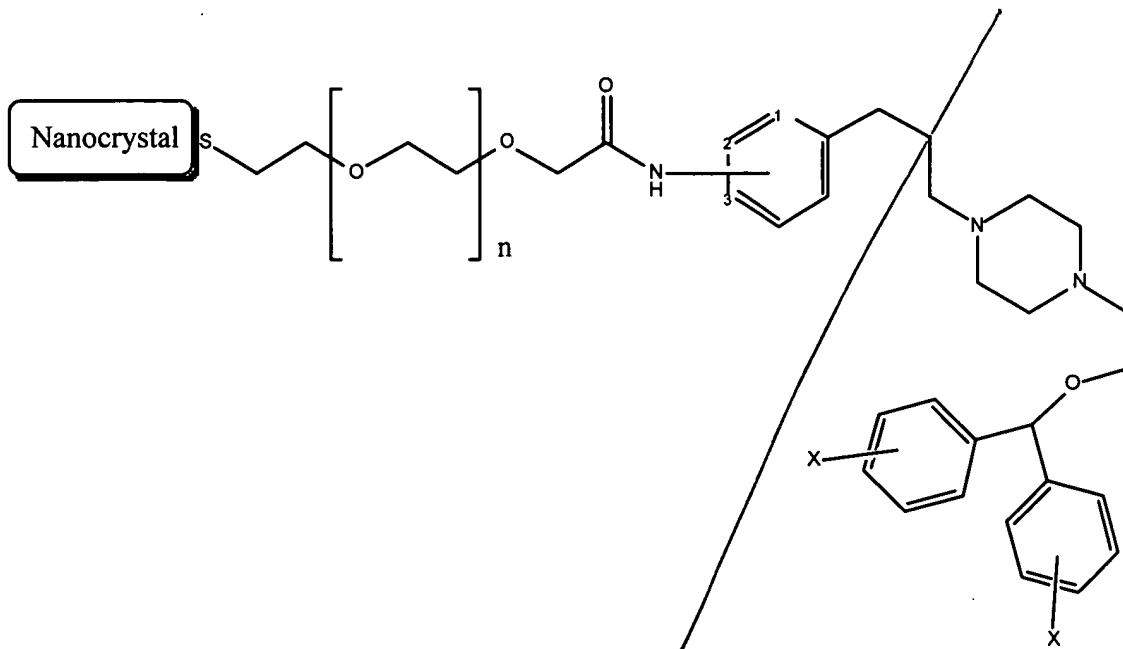


(II)

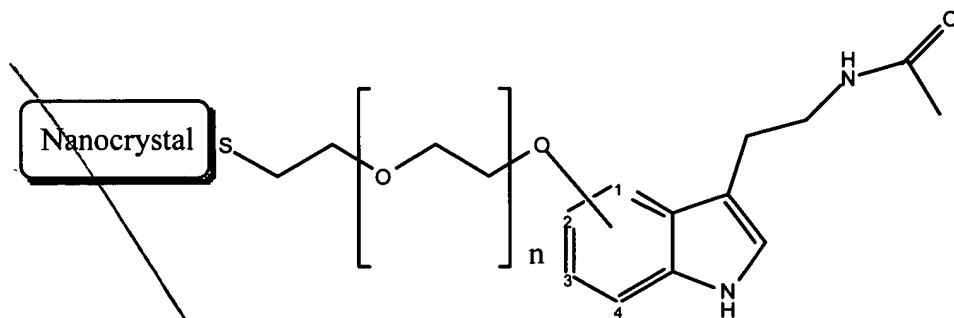


(III)

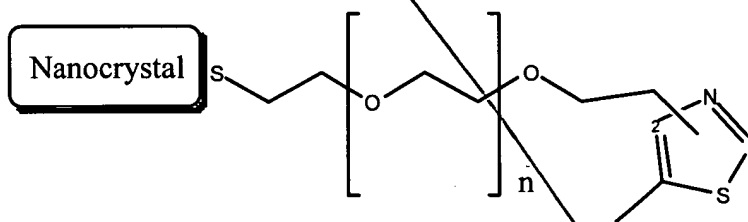
FIG. 20



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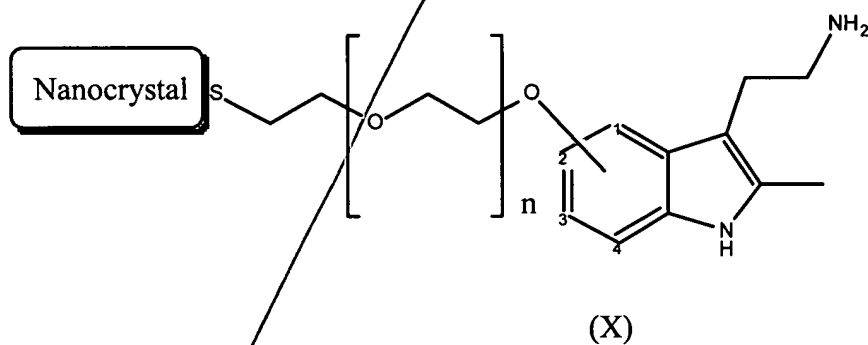
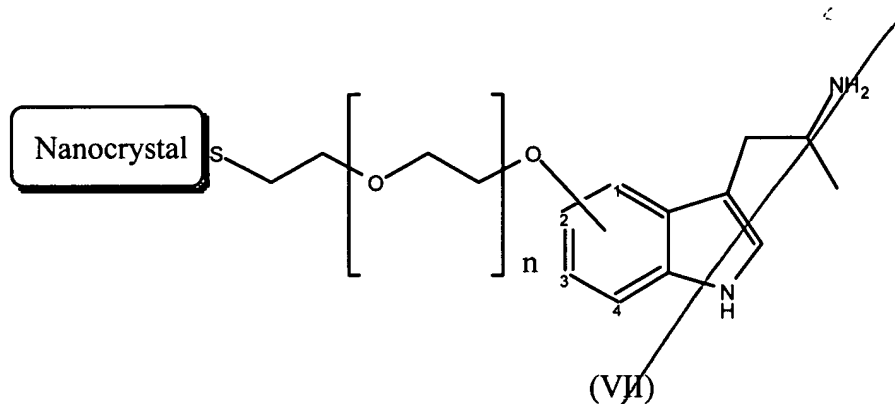


(V)

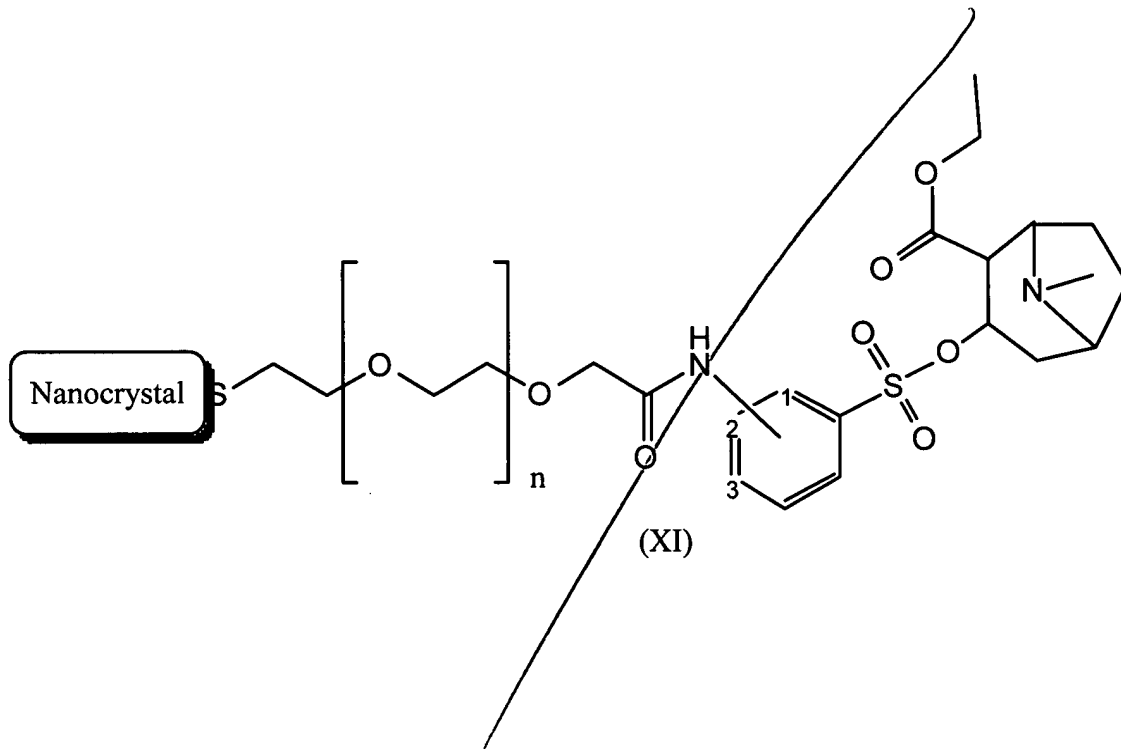


(VI)

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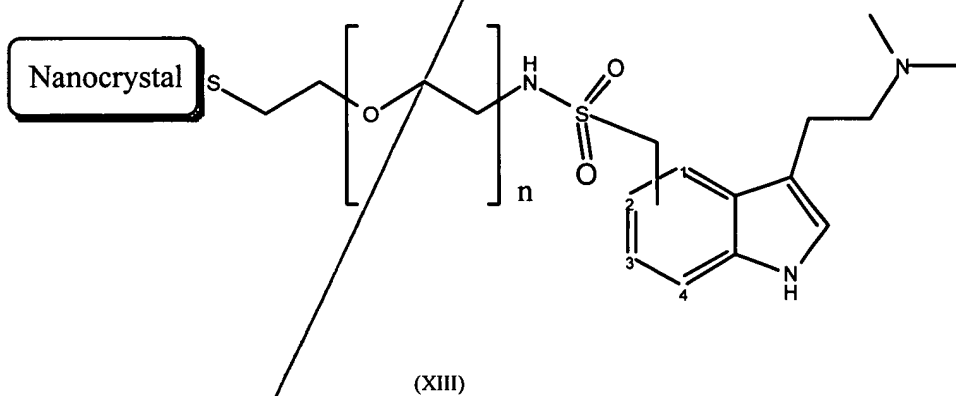
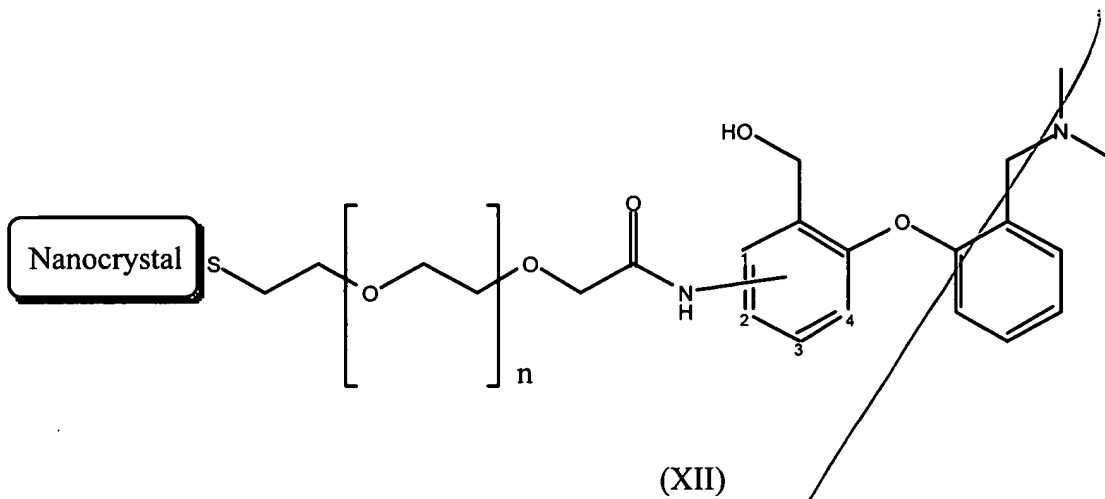


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wherein $n = 0-10$ and X is H or halogen.

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12. The nanocrystal compound of claim 8, wherein the nanocrystal has a cross section of less than about 200 angstroms.

5 13. The compound of claim 8, wherein the nanocrystal is selected from the group consisting of CdSe, CdS, PbSe, PbS, and CdTe.

10 14. The compound of claim 8, wherein the organic compound is capable of binding to an affinity molecule, the affinity molecule being a monoclonal antibody, polyclonal antibody, monomeric nucleic acid, oligomeric nucleic acid, protein, polysaccharide, sugar, peptide, drug, ligand.

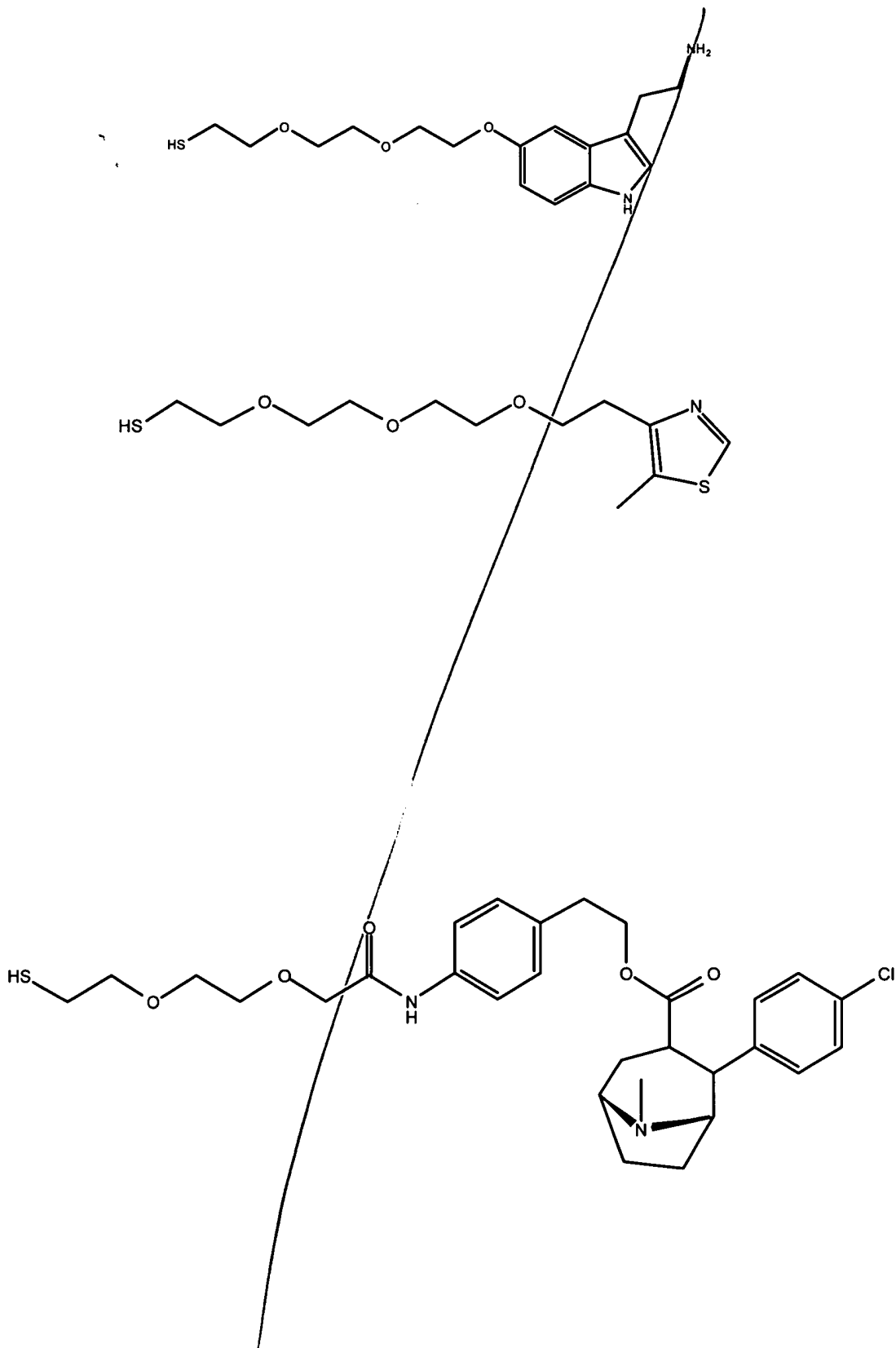
15 15. The compound of claim 8, wherein the organic compound is serotonin.

16. The compound of claim 8, selected from the group consisting of:

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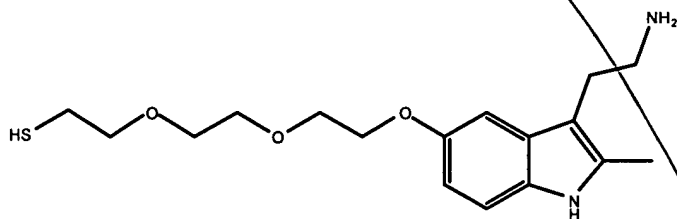
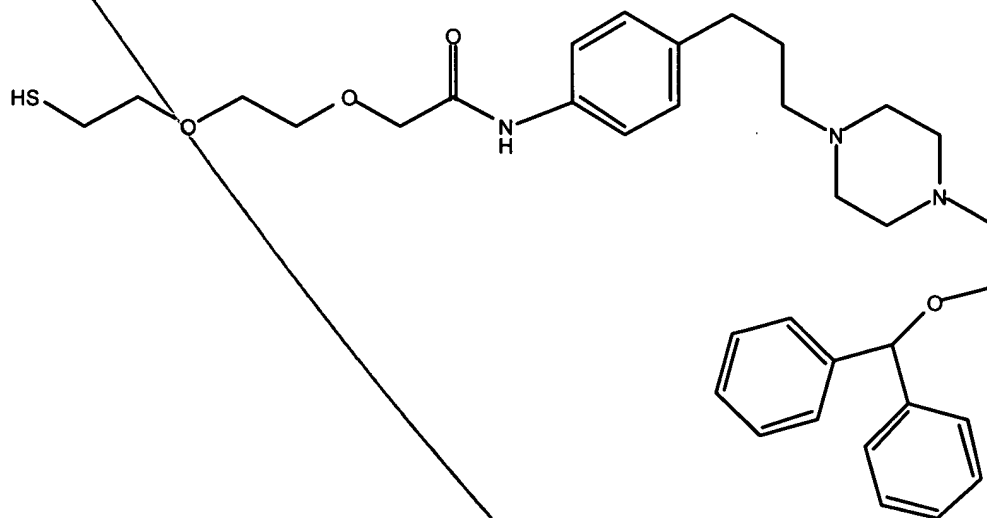
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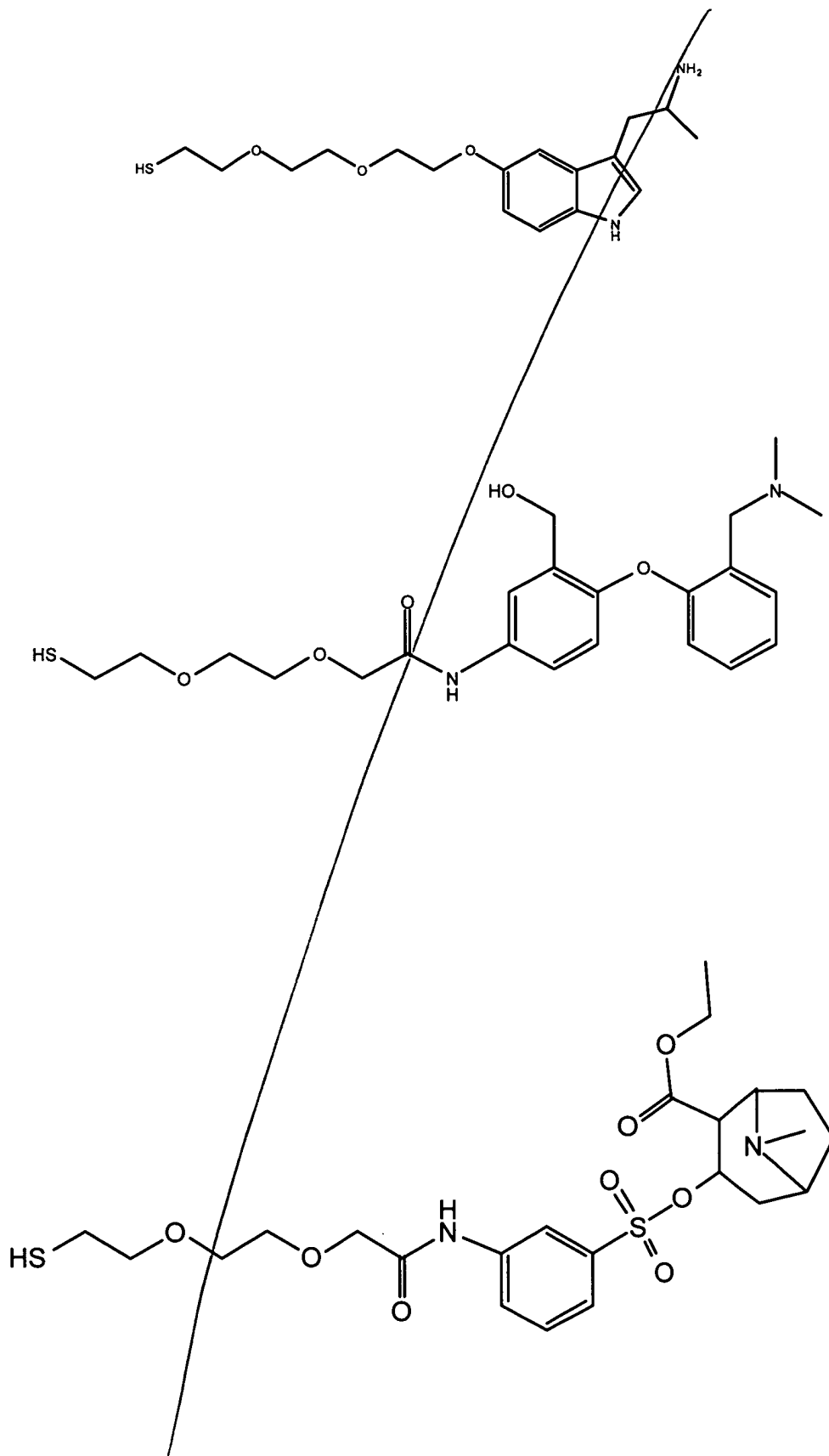


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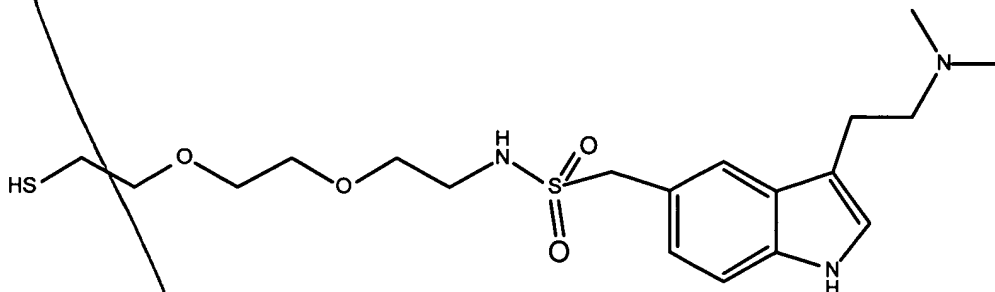
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FOIA(b)(7) - D

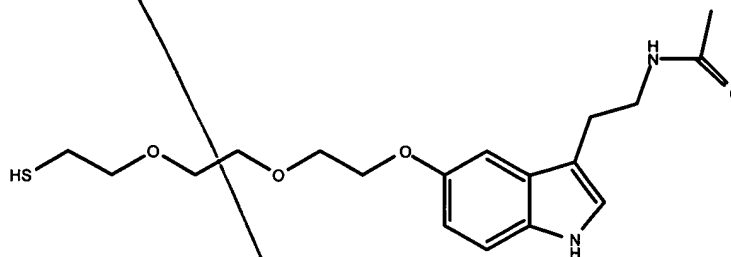
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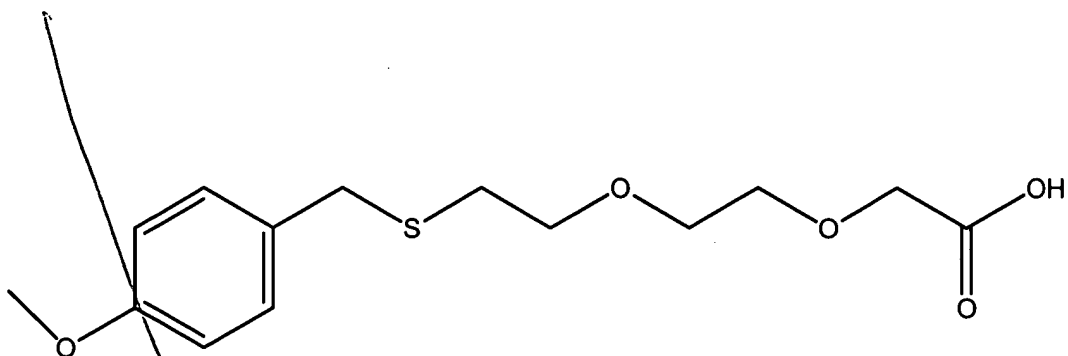
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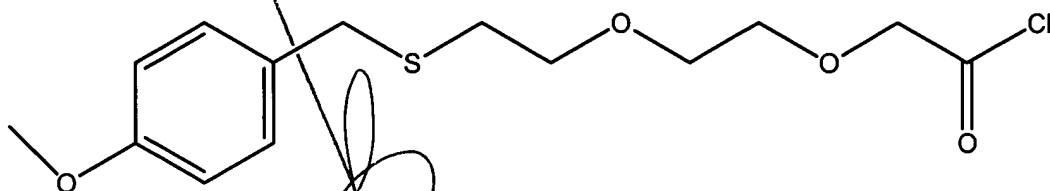
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wherein S is the attachment point for the nanocrystal.

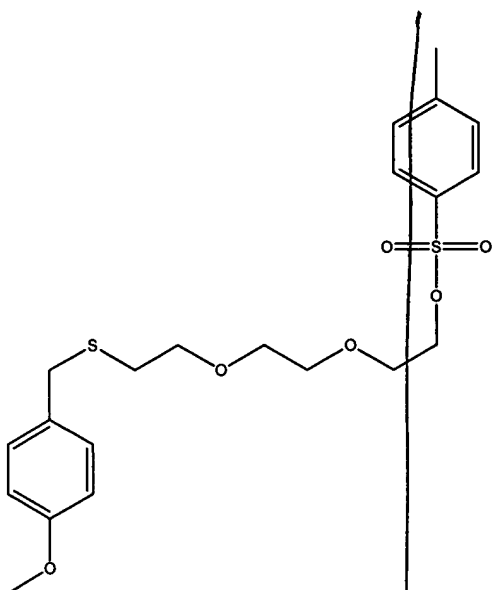
17. A compound of the following formula:



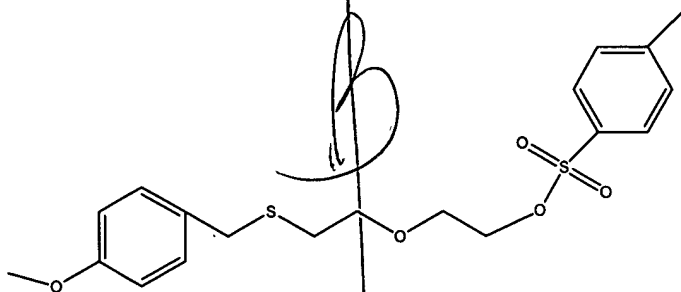
18. A compound of the following formula:



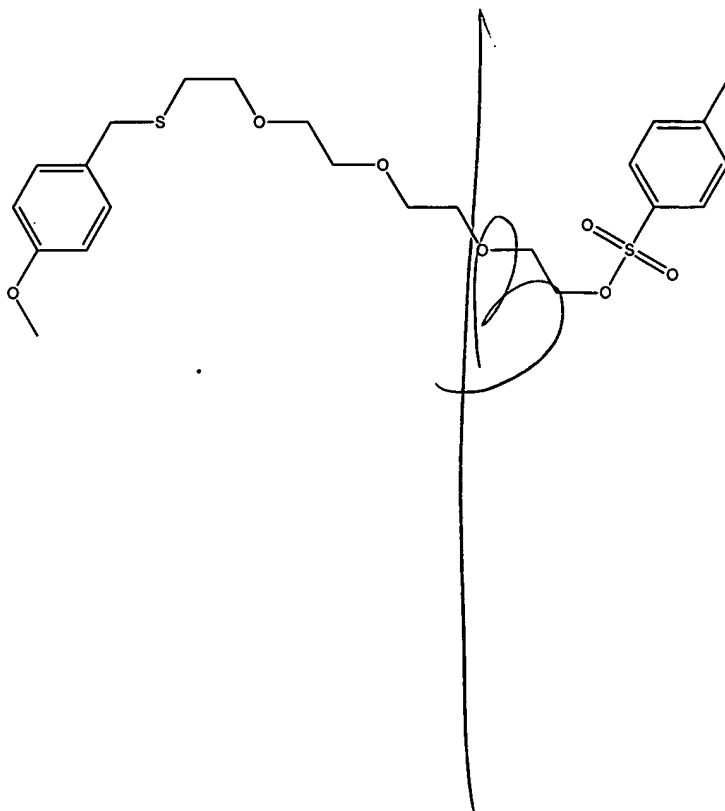
19. A compound of the following formula:



20. A compound of the following formula:



21. A compound of the following formula:



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